SANTA CLARA VALLEY WATER DISTRICT

CALABAZAS CREEK
Miller Avenue to Wardell Road

PROBLEM DEFINITION / REFINED OBJECTIVES REPORT

Project No. 26104001

Report Prepared by Capital Program Services Division:

Parivash Gharib	Assistant Engineer
Roy Weese, P.E.	Associate Civil Engineer
Saeid Hosseini, P.E.	Senior Project Manager

Katherine Oven, P.E.
Assistant Operating Officer

David Chesterman, P.E.
Deputy Operating Officer

NOVEMBER 2007

TABLE OF CONTENTS

MAIN REPORT

TABLE OF CONTENTS 1
I. Background 3
  A. Objectives 3
  B. History 3
  C. Previous Studies 4
    Comer Debris Basin 4
    Proposed Bollinger Road Bridge Replacement 5
    Removal of Old Bollinger Road Bridge 5
  D. Cities and Major Property Owners within the Watershed 6
    City of Cupertino 6
    City of San Jose 7
II. Existing Conditions 10
  A. Project Watershed Description 10
  B. Project Reach Description 15
  C. Creek Access 25
  D. Watershed Hydrology 25
  E. Calabazas Environmental Setting 29
    Field Survey 29
    Vegetation 29
    Wildlife 29
III. Problem Definition 31
  A. Creek Flooding 31
    Historical Flooding 31
    Flood Plain of Records 31
    Present Flooding 32
    Summary of One-percent Flooding 33
  B. Maintenance History 36
    Maintenance Access 36
    Historical Erosion Control and Sediment Removal 37
    Active Erosion 37
IV. Community Outreach 38
V. Opportunities & Constraints 39
  A. Land Use Opportunities 39
  B. Maintenance Access 39
  C. Public Access 40
VI. Potential Changes to Project Objectives & Scopes 40
VII. Next Steps 41
REFERENCES 42

MAIN REPORT ILLUSTRATIONS

FIGURES

FIGURE 1: REGIONAL LOCATION MAP 12
FIGURE 2: STUDY AREA 13
FIGURE 3: CITY BOUNDARIES 14
FIGURE 4: CALABAZAS REACH MAP 17
FIGURE 5: REGNART REACH MAP 18
FIGURE 6: RODEO REACH MAP 19
FIGURE 7: CALABAZAS CREEK ACCESS MAP 26
FIGURE 8: FLOODWATER BREAKOUT POINTS 35
FIGURE 9: MAINTENANCE ACCESS POINTS 36

TABLES

TABLE 1: CALABAZAS CREEK DESCRIPTION OF REACH 26 – REACH 33 15
TABLE 2: REGNART CREEK DESCRIPTION OF REACH 1 – REACH 4 15
TABLE 3: RODEO CREEK DESCRIPTION OF REACH 1 – REACH 5 16
TABLE 4: CALABAZAS CREEK – SUMMARY OF EXISTING CONDITION 22
TABLE 5: REGNART CREEK – SUMMARY OF EXISTING CONDITION 23
TABLE 6: RODEO CREEK – SUMMARY OF EXISTING CONDITION 24
TABLE 7: DESIGN FLOWS FOR CALABAZAS CREEK 27
TABLE 8: DESIGN FLOW RATES USED FOR CALABAZAS CREEK HYDRAULIC MODEL 28
TABLE 9: DESIGN FLOW RATES USED FOR REGNART CREEK HYDRAULIC MODEL 28
TABLE 10: DESIGN FLOW RATES USED FOR RODEO CREEK HYDRAULIC MODEL 28
TABLE 11: EXISTING CHANNEL CAPACITY VS. ONE-PERCENT FLOW 33
TABLE 12: CALABAZAS CREEK - SUMMARY OF HISTORICAL MAINTENANCE WORK 37
TABLE 13: REGNART CREEK - SUMMARY OF HISTORICAL MAINTENANCE WORK 37
TABLE 14: RODEO CREEK - SUMMARY OF HISTORICAL MAINTENANCE WORK 37
TABLE 15: CALABAZAS CREEK - SUMMARY OF ACTIVE EROSION LOCATIONS 38

APPENDIXES

APPENDIX A - CALABAZAS CREEK REACH DESCRIPTION

APPENDIX B - REGNART CREEK REACH DESCRIPTION

APPENDIX C - RODEO CREEK REACH DESCRIPTION

APPENDIX D - HYDROLOGY REPORT

APPENDIX E - HYDRAULIC STUDY MODEL RUN OUTPUT

APPENDIX F - BIOLOGY REPORT

I. BACKGROUND

A. Objectives

This proposed project (Project) is funded by the Clean Safe Creeks Benefit Assessment per the July 25, 2000 Clean, Safe Creeks & Natural Flood Protection publication. This Clean Safe Creeks project area extends from Miller Avenue to Wardell Road. However, the study area has been enlarged to include the Comer Debris Basin and Comer Drive at the Project Owner's request. The rationale behind this increased scope is based on public interest in the removal of the Comer Debris Basin Dam. See attached project location map.

The Project would address one-percent flooding, bank erosion, and investigate opportunities for creek enhancement. Creek enhancement could include vegetation or expansion of community recreational opportunities.

The Project Plan objectives approved by the project owner and consistent with Clean, Safe Creeks (CSC) Program are as follows:

- Develop a plan for the entire watershed that presents alternatives and a recommendation for providing flood protection for all flows up to the one-percent flood, erosion protection, and creek restoration for Calabazas Creek and its tributaries between Miller Avenue and Comer Drive.
- Provide flood protection to 2,483 homes, businesses and schools upstream of Miller Avenue from a one-percent (100-year) flood, preventing potential damages of $30.9 million dollars.
- Identify opportunities for environmental enhancement such as stream restoration, as well as trails, parks, and open space, for the Board's consideration.
- Minimize the cost of maintenance.

B. History

Prior to 1950, Calabazas Creek was aligned to flow into Saratoga Creek between El Camino Real and the Southern Pacific Railroad (which is now owned by the Union Pacific Railroad, UPRR). The creek was constructed on its present alignment as a creek separate from Saratoga Creek during the mid-1950s.

The 1992 Planning Study authorized additional flood control and re-vegetation work on Calabazas downstream of Miller Avenue. Following the 1992 Planning Study, the District invested more than twenty million dollars in construction costs alone to provide flood protection and vegetation of Calabazas Creek between the San Francisco Bay and Miller Avenue. This work left Calabazas Creek in its present condition with an earth channel and earth levees with intermittent floodwalls between the San Francisco Bay and HWY101.

C. Previous Studies

The District engaged in a planning effort on Calabazas Creek during the mid 1980's in preparation for creek improvements from the San Francisco Bay up to Miller Avenue. On May 26, 1992, the Board approved the Engineer's Report and Environmental Impact Report, Guadalupe Slough to Miller Avenue[1] (1992 Planning Study). The 1992 Planning Study required levee raisings, floodwalls, concrete trapezoidal channel modifications and gabion installations to protect adjacent communities from creek over banking and flooding. Bridge reconstruction was a major part of the flood control construction work authorized by the 1992 Planning Study. Bridges at Moffet Park Drive, Old Mountain View-Alviso Road and Tasman Drive were flood proofed. A clear span bridge replaced the existing box culvert at Kifer Road. A new parallel box culvert was placed under the Union Pacific Railroad (UPRR); additional cells were constructed at Lochinvar Avenue, Homestead Road, and Pruneridge Avenue. The culvert at Miller Avenue was replaced with a clear span bridge. Additionally, the 1992 Planning Study required the re-vegetation of Calabazas Creek between Lawrence Expressway and Miller Avenue. All of the work proposed by the 1992 Planning Study was implemented between 1994 and 2001. This planning study is a sequel or continuation of the planning work published in the 1992 Planning Study. In addition, some other studies have been done on the Calabazas Creek. Below is a summary of the most recent studies done upstream of Miller Avenue.

Comer Debris Basin

The Comer Debris Basin is located on Calabazas Creek, downstream of Comer Drive Bridge. The District constructed the basin in 1973 as a sediment collection facility consisting of a 12-foot high dam located approximately 300 feet downstream of Comer Drive Bridge. The basin was created to collect excess sediment resulting from the quarry work occurring further upstream. The Maintenance Unit historically excavated this excess sediment and hauled it off site. When sediment dropped out in the basin, the water flowing over the dam was also deprived of its normal supply of sediment. Consequently, it was noticed that after several years of operation that the downstream section between the dam and UPRR was eroded.

When the quarry work ceased in about 1992, the maintenance was discontinued. Since 2003, the District began pushing sediment to the side of the channel downstream of Comer Road (every year) in order to build up something similar to a levee. The hope was that sediment would then wash farther downstream, preventing the water from being sediment starved and allowing the invert to build back up downstream of the dam.

After 1992, the basin was allowed to fill, resulting in a reduction of clearance between the channel bottom and the Comer Drive Bridge from 10 feet to approximately 4 feet.

Currently, the basin is characterized by an exposed surface of coarse sediment and little vegetation. Debris and sediment flow through the basin and continue downstream. In late 2001, the District evaluated the possibility of removing or eliminating the Comer Debris Basin. The District's consultant, Kennedy/Jenks Consultants, published the *Comer Debris Basin Engineering Feasibility Study*[2] in April, 2002.

Proposed Bollinger Road Bridge Replacement

The Reconstruction of Bollinger Road Bridge over Calabazas Creek Project is being accomplished by a partnership between the City of Cupertino and the District. The partnership meets the combined goals of providing safe bicycle and pedestrian access, structural upgrading the bridge, and reducing flooding to nearby residences. Calabazas Creek has flooded three times at Bollinger Road since 1998. This project is an element of the Clean, Safe Creeks and Natural Flood Protection Plan for this particular section of Calabazas Creek.

The City of Cupertino retained the engineering design consultant Winzler and Kelly in 2001. The City and the District have collaborated in finalizing the construction documents. As a component of the design, the District contracted with Multech Engineering to perform a physical model study of the proposed design, resulting in a number of modifications for more efficient energy management and erosion protection. The new Bollinger Road Bridge construction work began in the summer of 2007. The District is responsible for CEQA compliance, acquisition of regulatory permits, construction administration, and costs associated with culvert reconstruction and stream stability. The City is responsible for acquisition of local permits, utility considerations, and costs associated with widening the bridge and structural retrofit of the remaining culvert section. The Bollinger Road Bridge replacement construction contract was awarded on May 8, 2007. The construction work will be completed in October 2008.

Removal of Old Bollinger Road Bridge

The Mitigated Negative Declaration[3] and Engineer's Report[4] for the reconstruction of Bollinger Road Bridge included the removal of the Old Bollinger Road Bridge upstream of the existing road. The work began in June 2005 and re-vegetation was completed in December 2005. This work has enhanced habitat and provides mitigation for impacts associated with the Bollinger bridge culvert construction.

D. Cities and Major Property Owners within the Watershed

City of Cupertino

The Calabazas watershed lies within the southern portion of the City of Cupertino. Most of the information in this section (shown in *italic text)* is taken from the City's General Plan which contains the City's General Environmental Management policies.

The following is a general description of the wildlife and vegetation guidelines found within the City of Cupertino's General Plan.

Wildlife and Vegetation guidelines:
Preserve and protect special areas of natural vegetation and wildlife habitation as integral parts of the environment.
Cupertino's wildlife and natural vegetation resources are concentrated in the relatively undeveloped western foothills and mountains and along Stevens Creek, not on the valley floor. Urbanization of the valley floor has rendered this environment ill-suited to the needs of wildlife and native plants. Most of the native vegetation was removed by historic agricultural activities and the introduction of non-native grasses and crops. Native vegetation was further reduced by the more recent construction of homes, businesses, industries and infrastructure that supports this suburban community. The loss of vegetation also meant a concomitant loss of wildlife habitat which provided food, cover and shelter for numerous wildlife species.

Streamside guidelines
Riparian vegetation grows along stream courses where there is fertile soil and ample water. It often appears as a distinct band of vegetation when contrasted against other uses. Such vegetation can be found along Stevens Creek, Permanente Creek, Regnart Creek, Heney Creek and portions of Calabazas Creek. Common plants include willow, California bay, California buckeye, Coast live oak, coyote brush, poison oak and California blackberry. Riparian habitats are considered among the most valuable habitats for wildlife because of the presence of water, lush vegetation and high insect populations. Less disturbed riparian areas support a wide variety of wildlife, including amphibian, reptile, and bird and mammal species.

The following City guideline addresses public access within the flood plain.

Land uses in the flood plain should allow the public access to the creek, but should prohibit materials that would restrict the free flow of creek waters or significantly disturb the streamside environment.

The Project follows a Stream Maintenance Program which allows long-term stream maintenance work and provides bank stabilization, erosion protection and flood protection without jeopardizing the long-term health of the stream ecosystems. Vegetation management is the major maintenance activity. Other minor maintenance activities include trash removal, fence and access repair, maintenance of re-vegetation sites, and removal of downed trees or other blockages within the stream.

The following City Policies address the public access, recreation and wildlife trails.

Policy 5-19: Public Access
Provide public access to wildlife observation and fishing sites consistent with preserving important wildlife habitat.

The existing trail through Calabazas Park runs along the eastern bank and is used frequently by local residents who enjoy the pleasant scenery and opportunity for wildlife observation while walking through the park. Maintaining and improving the public access this area provides is one example which is included in the project goals. Creek-side improvements necessary for flood protection as well as erosion control will be chosen which maintain the natural beauty of the creek while increasing public access whenever feasible.

Additionally, the District is evaluating the possibility of reopening the abandoned Calabazas Creek channel that went into the Park area so that the creek could wind through the Park instead of flowing along the edge of the Park. If this option is selected, much greater access to the creek would be provided to Park visitors.

Policy 5-20: Recreation and Wildlife Trails
Provide open space linkages within and between properties for both recreational and wildlife activities, most specifically for the benefit of wildlife which is threatened, endangered or designated as species of special concern.

Identification and elimination of wildlife barriers is part of the Project Plan. Investigating and taking inventory of the flora and fauna present in each reach provides an assessment of what would be needed to maintain a continuous riparian environment. Trails and open spaces would be provided when the opportunity exists to increase the land available to wildlife and the public. This policy coincides with the objective of this Project to seek opportunities to enhance the urban environment, such as stream restoration, trail connectivity, construction of park areas, and undeveloped space alongside creeks.

City of San Jose

Calabazas watershed lies within the western portion of the City of San Jose. Most of the information provided in this section (shown in *italic text)* is taken from the City of San Jose's General Plan (SJGP) which contains policies concerning the following four subjects:

- *Trails and Pathways (page 109 of the SJGP)*
- *Riparian Corridors and Upland Wetlands (page 113 of the SJGP)*
- *Water Resources (page 118 of the SJGP)*

- *Flooding Policies (page 128 of the SJGP)*

Components of these four policies support the "Calabazas Creek Planning Study – Miller to Wardell". Pertinent segments of these four policies are reprinted below exactly as they appear in the May, 2005 version of the SJGP.

Trails and Pathways:

Goal

Provide a network of trails and pathways throughout the City in order to maximize the City's recreational opportunities and to provide alternate means of both commuting and reaching regional parks and other natural areas.

San Jose Policies (This report only cites the policies that apply to this project)

3. *Design, construction and management of trails and pathways should be carefully executed in order to minimize environmental disturbance.*

4. *Bridges and other public improvements within designated Trails and Pathways Corridors should be designed to provide safe and secure routes for trails, including grade separation off roadways and trails whenever feasible.*

5. *The City should promote cooperative interagency planning of trails and pathways in order to establish and encourage their use for both recreational purposes and as alternate transportation routes.*

7. *Trails should be built to meet the trail standards established by the Department of Public Works. Trail design should provide sufficient light, vertical and horizontal clearance, and landscape setbacks from adjacent development to ensure a safe and aesthetically pleasing recreational experience.*

The District is coordinating with the City to gather input and advice on the possibility of trails within the project.

Riparian Corridors and Upland Wetlands:

Goal

Preserve, protect, and restore riparian corridors and upland wetlands within the City of San Jose's Sphere of influence.

San Jose Policies (This report only cites the policies that apply to this project)

1. *Creeks and natural riparian corridors and upland wetlands should be preserved whenever possible.*

The District is evaluating the possibility of reopening the abandoned portion of Calabazas Creek that went through Calabazas Park. This alternative would help preserve the natural creek riparian corridor.

5. *When disturbances to riparian corridors and upland wetlands cannot be avoided, appropriate measures should be required to restore, or compensate for damage to the creeks or riparian corridors*

The District will use Natural Flood Protection (NFP) guidelines to evaluate any impacts that might result from implementation of the respective alternatives. Alternatives that would impact the riparian corridors will be weeded out.

6. *The City encourages appropriate native plant restoration projects along riparian corridors, upland wetlands, and in adjacent upland areas.*

The Project would include the removal of non-native invasive species.

7. *The City should consider the preparation of a Riparian Restoration Action Plan to assess riparian conditions and identify potential riparian restoration programs and priorities.*

The District will evaluate re-vegetation plans as needed to mitigate for any negative impacts of the flood protection work.

8. *Natural riparian corridors outside the Urban Service Area should be protected from disturbance associated with development (such as structures, roadways, sewage disposal facilities and overhead utility lines except those required for flood control or bridging) by a minimum 150 foot setback from the top bank line, wherever feasible.*

The District will use NFP guidelines to evaluate any impacts that might result from implementation of the respective alternatives. Alternatives that would impact the riparian corridors will be weeded out.

Water Resources:

Goal
Protect water resources because they are vital to the ecological and economic health of the region and its residents.

San Jose Policies (This report only cites the policies that apply to this project)

3. *The City should encourage the Santa Clara Valley Water District to restrict public access and recreational uses on land adjacent to rivers, creeks, freshwater wetlands, and other significant water courses when water quality could be degraded.*

This policy may be a constraint to the project. The District will continue coordination with the City of San Jose and residents to arrive at a Project Plan that meets everyone’s needs to the greatest extent practicable.

Flooding:

*Goal*
Protect the community from the risk of flood damage.

San Jose Policies (This report only cites the policies that apply to this project)

3. Designated floodway areas should be preserved for non-urban uses.

The District has rights-of-way throughout the project limits. There is no plan to quitclaim rights-of-way over creek areas. If anything, creek and natural habitat areas would be enlarged through the project.

6. The City should support State and Federal legislation which provides funding for the construction of flood control improvements in urbanized areas.

The Project would comply with all State and Federal laws.

8. The City should cooperate with the Santa Clara Valley Water District to develop additional flood control retention facilities in areas where existing retention facilities are nearing capacity.

Flooding issues and existing retention facilities don't exist in the portion of this project which is located in the City of San Jose.

City of Saratoga

Saratoga hasn't published any specific guidelines. However, the City of Saratoga has constructed a picnic area adjacent to Calabazas Creek and upstream of the Saratoga-Sunnyvale road crossing. It provided a small recreational space for residents while causing little disturbance to the existing natural vegetation and ecology. The District has permitted the City of Saratoga to proceed with this facility allowing for joint use of this District easement for flood control and recreational use. The construction of the picnic area coincides with the objectives of the project as well as District policy.

II. EXISTING CONDITIONS

A. Project Watershed Description

The entire Calabazas Creek watershed lies within the Northwest portion of Santa Clara County and is in North Central Zone as shown in Figure 1. The study area is found in the southern portion of the watershed as shown in Figure 2. Calabazas Creek extends approximately 13.3 miles and has its headwaters on the east slopes of the Santa Cruz Mountains, which flows in a northeasterly direction to outfall into Guadalupe Slough, just north of Mountain View-Alviso Road. The watershed includes about 21 square miles of mountain and valley floor land and five major tributaries; Prospect Creek, Rodeo Creek, Regnart Creek, Junipero Serra Channel and El Camino Storm Drain.

A concrete lined channel now exists from HWY 101 upstream to Lawrence Expressway. Gabion baskets filled with rock currently line the channel banks between Lawrence Expressway and Miller Avenue.

The location of this Project is in the upper portion of the creek, between Miller Avenue and Comer Drive, which is about 3.7 miles long and runs through the Cities of Saratoga, San Jose and Cupertino as shown in Figure 3. Within the project limits, the watershed is heavily urbanized and the creek has an average slope of about 0.9 feet/100 feet. In the project reach, only three major tributaries flow into the Calabazas Creek; Prospect Creek enters Calabazas Creek immediately downstream of Union Pacific Railroad (UPRR), Regnart Creek enters at about 1000 ft upstream of Miller Avenue and the Rodeo Creek enters at about 2700 ft upstream of Bollinger Road.

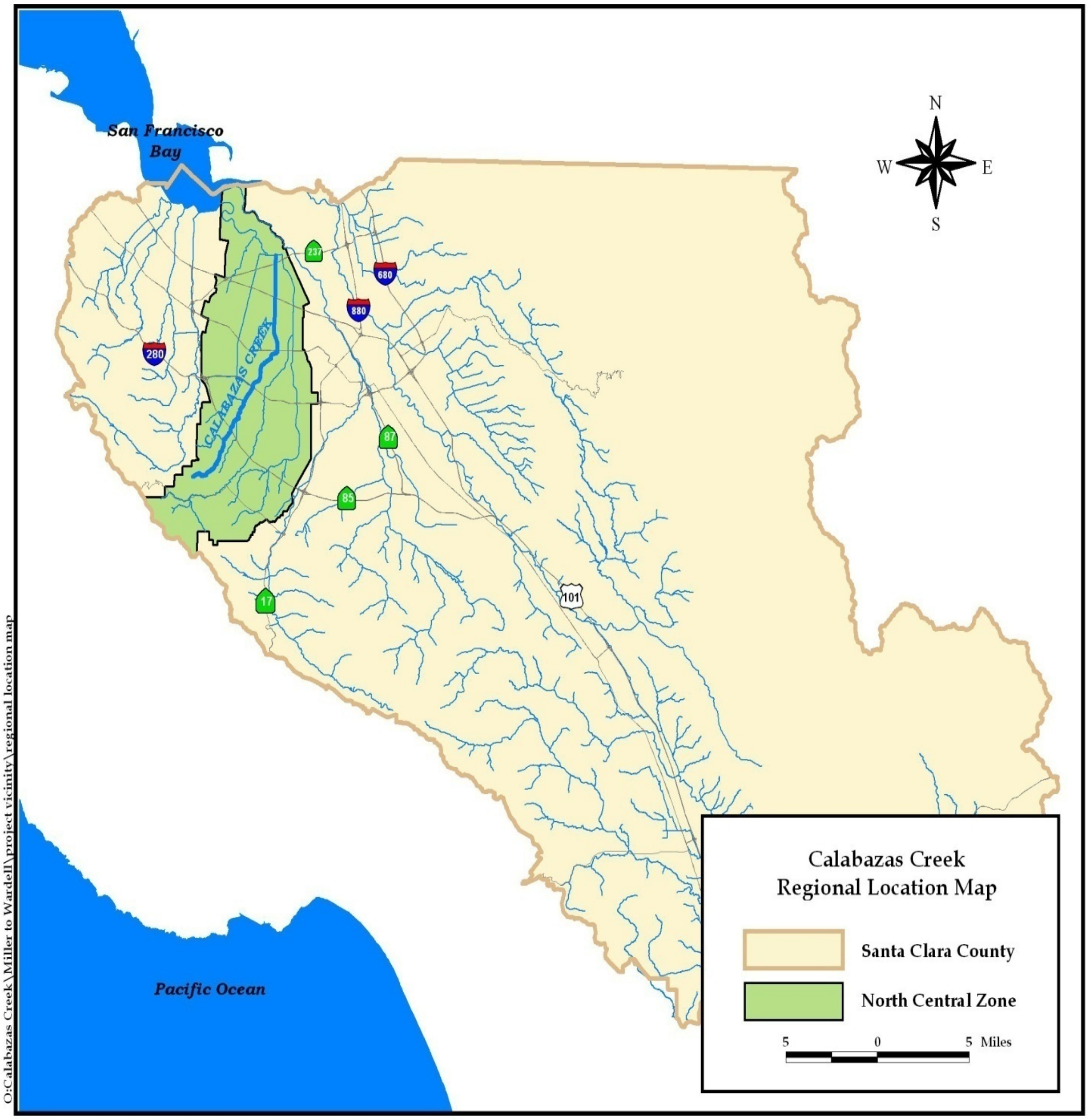

FIGURE 1: REGIONAL LOCATION MAP

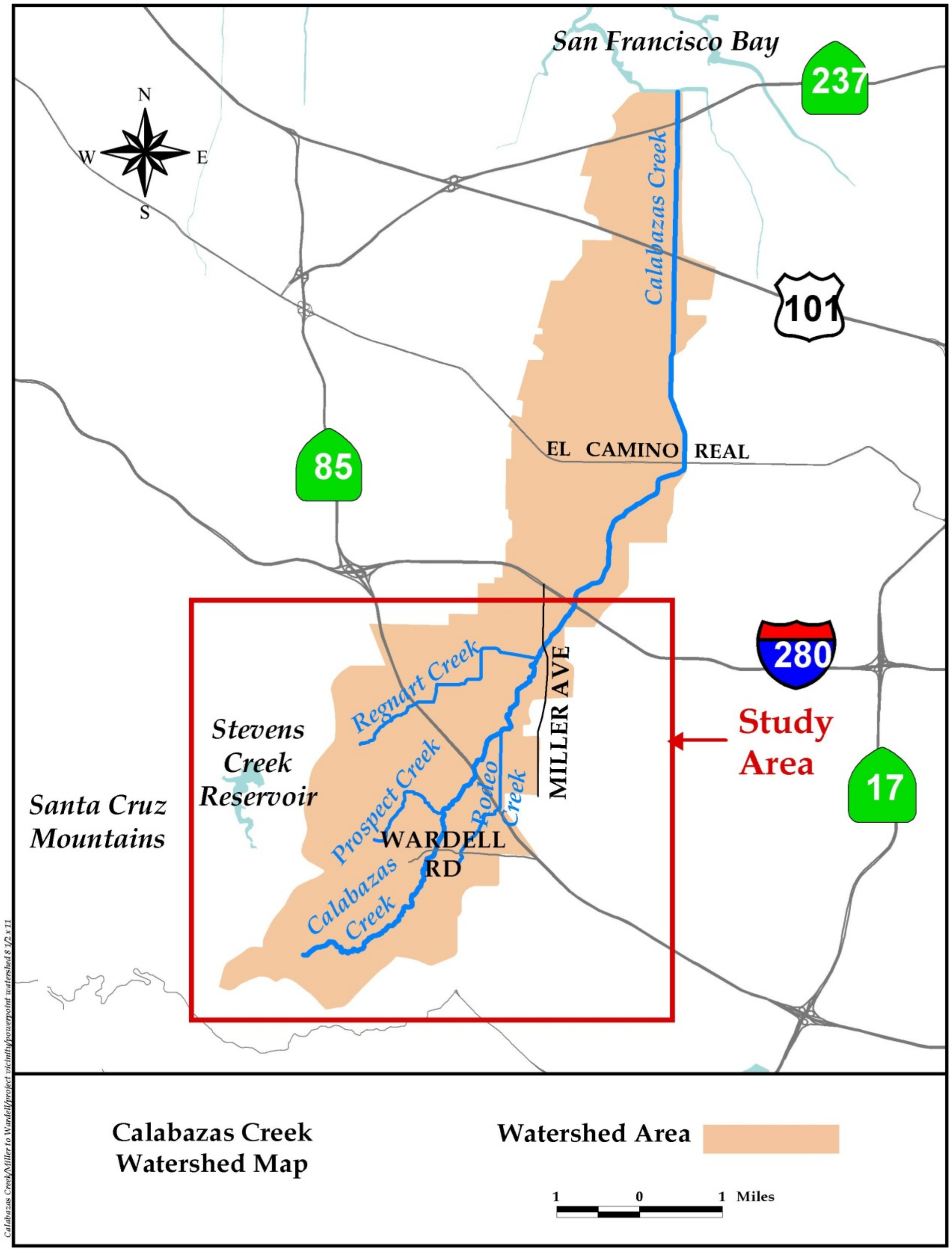

FIGURE 2: STUDY AREA

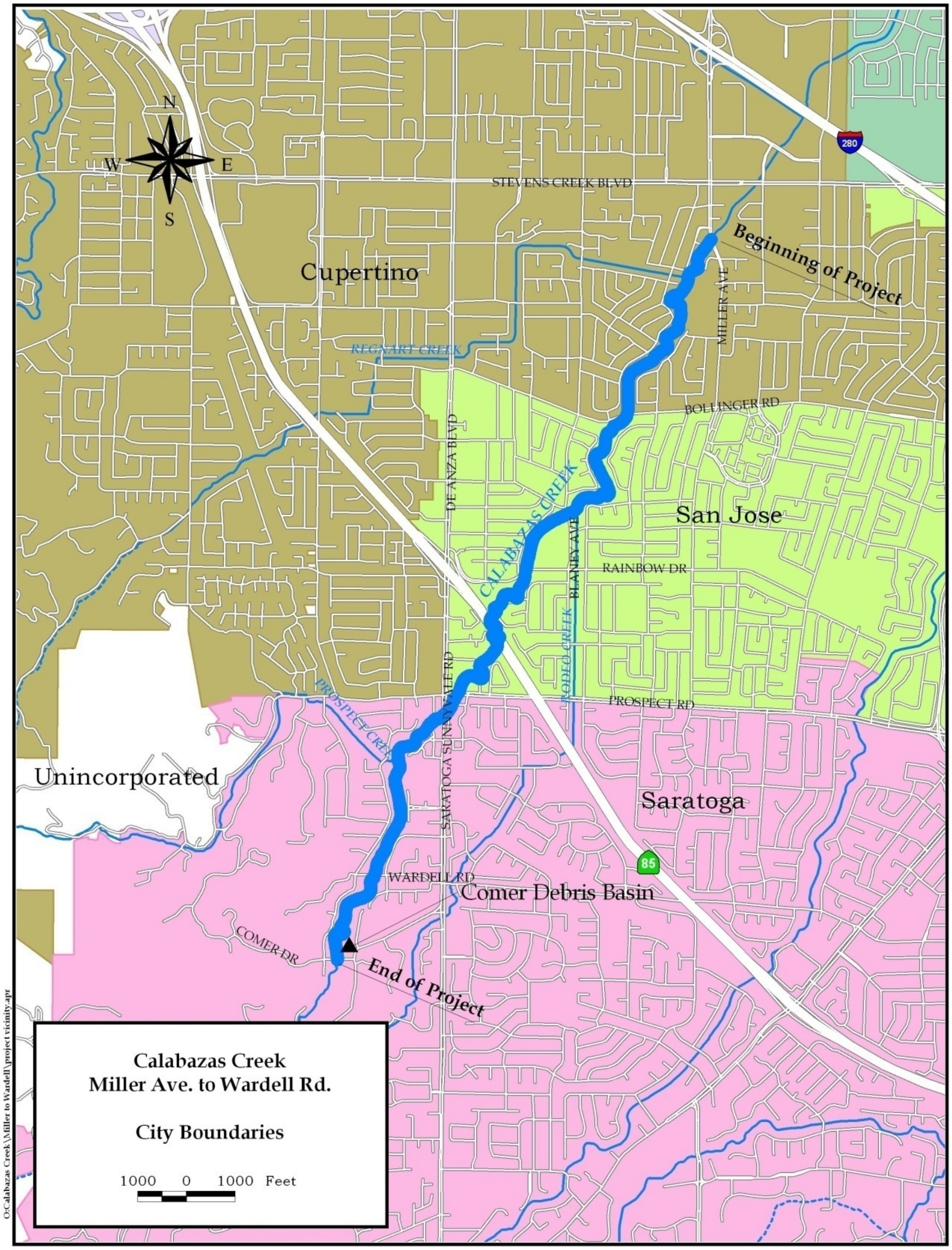

FIGURE 3: CITY BOUNDARIES

B. Project Reach Description

This project spans 3.6 miles of natural channel within the Cities of Cupertino, San Jose and Saratoga. The project area is adjacent to the foothills of the Santa Cruz Mountains.

This planning study is a sequel or continuation of the 1992 Planning Study[1]. In the 1992 Planning Study, Miller Avenue was the upstream end of Reach 25. This report denotes planning work immediately upstream of Miller Avenue as Reach 26.

For the three major tributaries flowing into the Project reach, during the one-percent storm, Regnart Creek, Rodeo Creek and Prospect Creek convey about 560 cubic feet per second (cfs), 320 cfs, and 290 cfs into Calabazas Creek, respectively. Other minor unnamed tributaries and ditches empty into Calabazas Creek within the project limits at various locations.

For ease of study, Calabazas Creek was divided into the 8 reaches (Table 1, below):

Table 1: Calabazas Creek description of Reach 26 – Reach 33

Reach	From	To	Approximate Distance (feet)
26	Upstream of Miller Avenue	Upstream of Bollinger Road	4,368
27	Upstream of Bollinger Road	Upstream of Blaney Avenue	3,122
28	Upstream of Blaney Avenue	Upstream of Rainbow Drive	1,568
29	Upstream of Rainbow Drive	Upstream of SR 85	1,788
30	Upstream of SR 85	Upstream of Saratoga-Sunnyvale Road	2,009
31	Upstream of Saratoga-Sunnyvale Rd.	Upstream of UPRR	1,669
32	Upstream of UPRR	Upstream of Wardell Road	2,278
33	Upstream of Wardell Road	Upstream of Comer Drive	2,272

A map displaying all of these reaches and major Calabazas Creek tributaries can be found in Figure 4, Calabazas Reach Map. In a manner similar to Calabazas, the Regnart and Rodeo creeks also were divided into reaches as listed in Table 2 and Table 3.

Table 2: Regnart Creek description of Reach 1 – Reach 4

Reach	From	To	Approximate Distance (feet)
1	Calabazas Confluence	Upstream of Blaney Ave.	2233
2	Upstream of Blaney Ave.	Upstream of Pacifica Dr.	2566
3	Upstream of Pacifica Dr.	Upstream of Antoinette Dr.	1082
4	Upstream of Antoinette Dr.	Downstream of Kim St.	2458

A map displaying all of these reaches found in Figure 5 Reach Map.

Table 3: Rodeo Creek description of Reach 1 – Reach 5

Reach	From	To	Approximate Distance (feet)
1	Calabazas Confluence	Upstream of Dandridge Dr.	553
2	Upstream of Dandridge Dr.	Upstream of Rainbow Dr.	836
3	Upstream of Rainbow Dr.	Upstream of Dartmoor Way.	1528
4	Upstream of Dartmoor Way	Upstream of Prospect Rd.	1127
5	Upstream of Prospect Rd.	Downstream of SR 85 tunnel	870

A map displaying all of these reaches can be found in Figure 6 Reach Map.

.

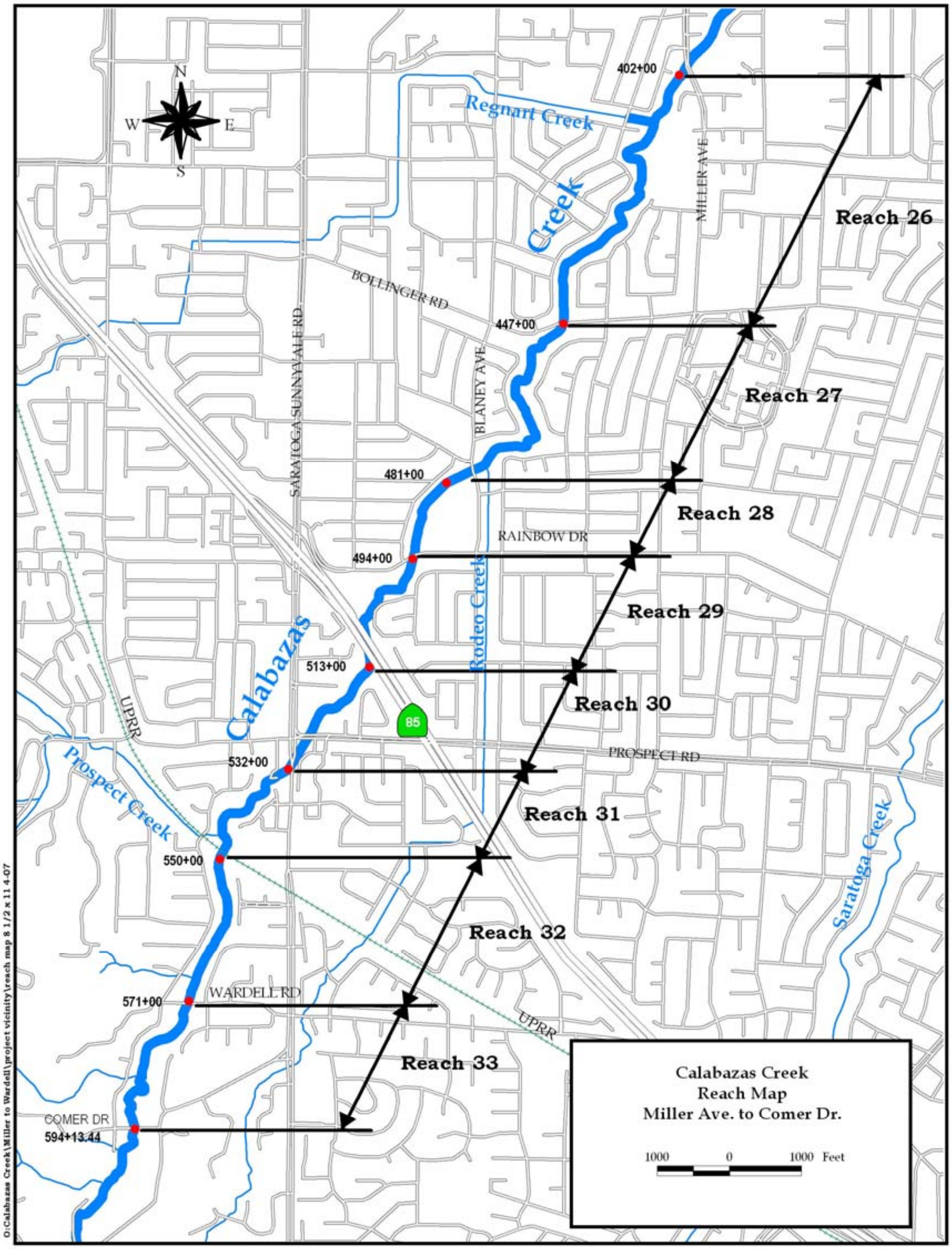

FIGURE 4: CALABAZAS REACH MAP

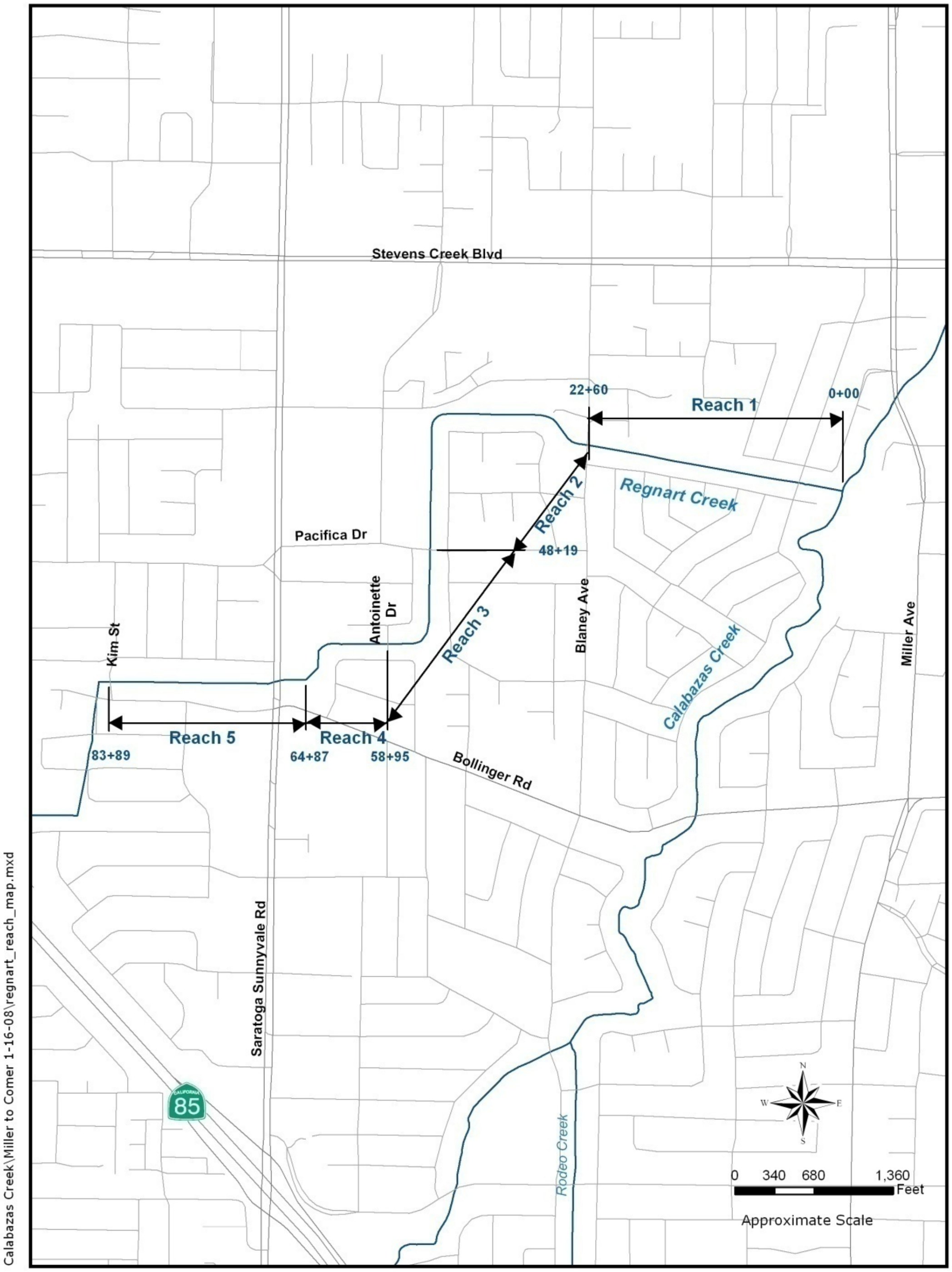

FIGURE 5: REGNART REACH MAP

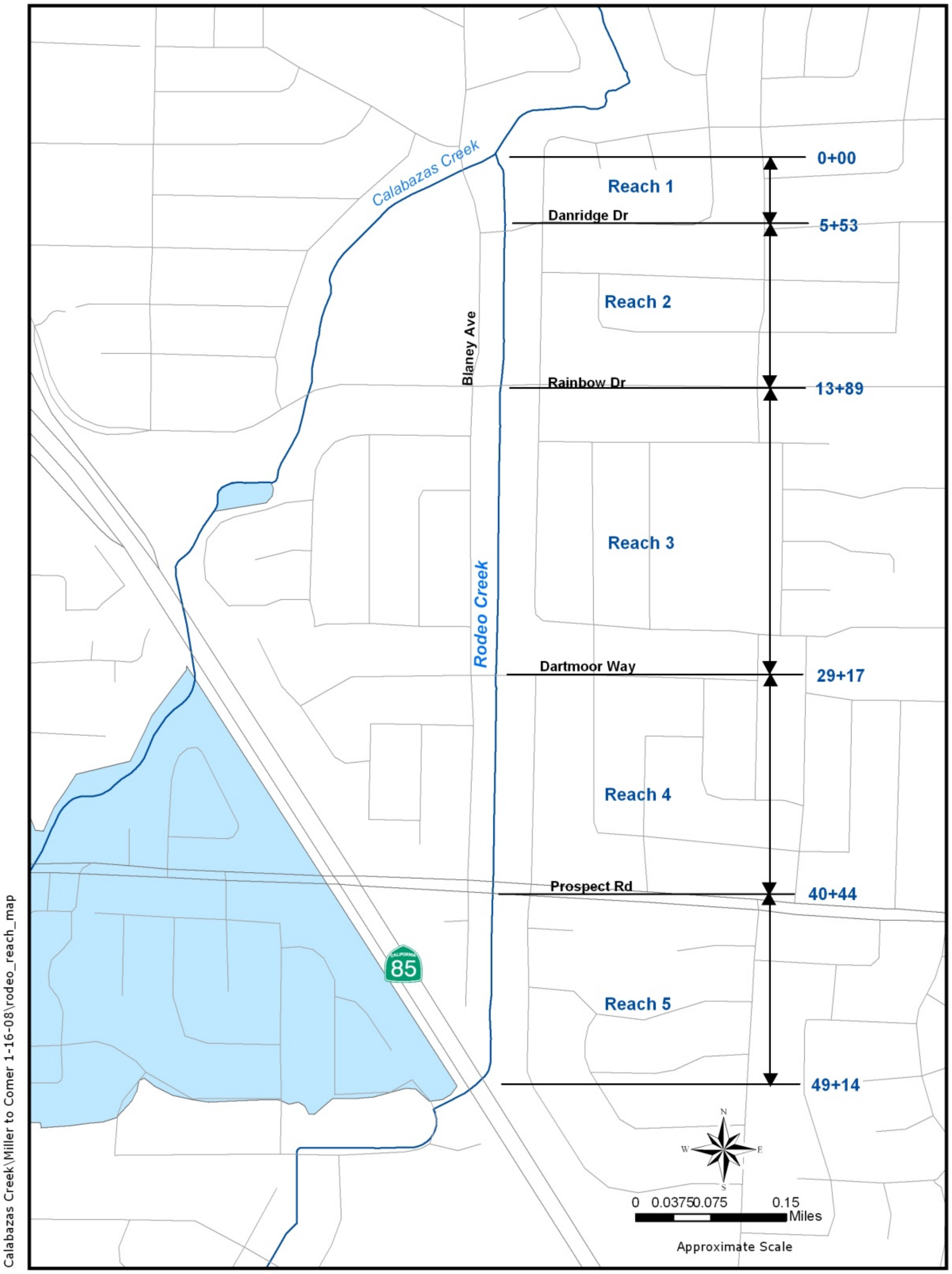

FIGURE 6: RODEO REACH MAP

The following information was studied for each reach of this Project:

- **Reach:** A brief description of the location and length of each reach introduces each section describing each of the reaches.

- **Reach Description:** A general description (i.e. channel type, stream bank condition, floodplain and invert material, reach location, etc.) of the existing condition of the channel within each reach is provided.

- **Reach Right–of-Way:** The existing SCVWD Rights-of-Way (if any) extent and type are identified for Calabazas Creek only and not for Regnart Creek or Rodeo Creek tributaries.

- **Reach Average Invert Slope:** The average slope of the reach invert is provided.

- **One-percent Flow:** Based on FEMA criteria, the one-percent flood (100-year return interval flood) would be used for design. One-percent flow rates for each reach were collected from the District's Hydrology Unit in 2003 and are the same as those found in the 2007 District Hydrology Report.

- **Ten-percent Flow:** Ten-percent flow rates for the reach were collected from the District's Hydrology Unit in 2003, which are the same as the flow rates found in the 2007 District Hydrology Report. This flow will be used for interior drainage study of the Cities' storm drainage system.

- **Current Reach Capacity (ies):** The existing (as is) reach capacity with some minor changes to the survey cross sections is calculated. The reach capacity is the maximum flow that the reach can currently convey without flooding with zero freeboard. These capacities were calculated for each flooding area.

- **Reach Flooding Area Profiles:** The reach existing flooding profiles are identified. See Appendix E for details.

- **Reach Roughness Coefficient:** The reach roughness coefficient (Manning's "n" value) is calculated, see Manning's "n" value Report for Calabazas Creek, Regnart Creek and Rodeo Creek.

- **Reach Typical Photos:** Color photographs of the existing channel are provided (with the date and the approximate location, in some area, of the photo identified) for each reach. The photos within this section of the report include a station number below each photograph. This station is the approximate Calabazas Creek, Regnart Creek and Rodeo Creek control line station where the photographer stood to take the picture.

- **Reach Erosion Problem:** Significant erosion problems, if any, are identified.

Completed study results are attached in Appendixes A, B and C and the project site existing condition is summarized on the following Table 4 for Calabazas Creek, Table 5 for Regnart Creek and Table 6 for Rodeo Creek.

Table 4: Calabazas Creek – Summary of Existing Condition

Calabazas Creek	Description	District owns enough Right-of-Way	Average Invert Slope	Creek Current Capacity*	Flooding Area Profiles	Erosion Problem[1]
Reach 26	Mostly trapezoidal natural channel	Yes	0.54%	Over one-percent capacity	No issue	Several sever erosion
Reach 27	Unimproved natural earth w/ a few sack concrete erosion repairs	No	0.89%	Over one-percent capacity	No issue	Spot erosion
Reach 28	Straight trapezoidal earth channel w/spot channel erosion work	Yes	0.91%	About 200' is below one-percent capacity	See Appendix E: Hydraulic Output & Profile	Considerable spot erosion
Reach 29	Straight w/some curve alignment trapezoidal earth channel	No	1.30%	About 310' is below one-percent capacity	See Appendix E: Hydraulic Output & Profile	Considerable spot erosion
Reach 30	Primarily straight w/some meandering alignment trapezoidal natural channel	No	0.90%	Over one-percent capacity	No issue	Considerable spot erosion
Reach 31	Straight w/some meandering alignment trapezoidal natural channel	No	1.10%	About 400' is below one-percent capacity	See Appendix E: Hydraulic Output & Profile	Several erosion sites
Reach 32	Mainly straight w/some curve alignment trapezoidal earth channel	No	0.90%	About 610' is below one-percent capacity	See Appendix E: Hydraulic Output & Profile	Several erosion sites
Reach 33	Straight to sinuous alignment trapezoidal earth channel	No	1.50%	Over one-percent capacity	No issue	Several erosion sites

* Data is retrieved from hydraulic analysis in Section III, Present Flooding.

[1] See Figure 7 for known sites of severe erosion.

Table 5: Regnart Creek – Summary of Existing Condition

Regnart Creek	**Description**	**District owns enough Right-of-Way**	**Average Invert Slope**	**Creek Current Capacity***	**Flooding Area Profiles**	**Erosion Problem**
Reach 1	Straight, trapezoidal channel with moderate slope; concrete on both sides	Yes	0.3%	Over one-percent capacity	No issue	None noted
Reach 2	Straight, trapezoidal channel with engineered bends; rock & sack concrete bank protection	Yes	0.5%	Over one-percent capacity	No issue	Mildly incised invert, spot erosion
Reach 3	Straight, trapezoidal channel with earth banks	Yes	0.5%	Over one-percent capacity	No issue	Bank erosion, repaired at one site
Reach 4	Straight, trapezoidal channel with earth banks; moderate slope.	Yes	1.5%	Over one-percent capacity	No issue	None noted
Reach 5	Straight, trapezoidal channel with earth banks; moderate slope.	Yes	1.5%	Over one-percent capacity	No issue	None noted

Table 6: Rodeo Creek – Summary of Existing Condition

Rodeo Creek	Description	District owns enough Right-of-Way	Average Invert Slope	Creek Current Capacity*	Flooding Area Profiles	Erosion Problem
Reach 1	Straight, trapezoidal, engineered channel with earthen banks	Yes	0.1%	Over one-percent capacity	No issue	None noted
Reach 2	Straight, trapezoidal, engineered channel with combination of earthen, sack concrete & rock banks	Yes	1.2%	Over one-percent capacity	No issue	None noted
Reach 3	Straight, trapezoidal, engineered channel with gabions and invert protection	Yes	0.4%	About 300' is below one-percent capacity	Minor maintenance work	None noted
Reach 4	Straight, trapezoidal, engineered channel with gabions and invert protection	Yes	0.4%	Over one-percent capacity	No issue	None noted
Reach 5	Straight, trapezoidal channel with gabions and one bend	Yes	0.4%	Over one-percent capacity	No issue	None noted

C. Creek Access

The District's maintenance creek service includes, but is not limited to the following:

- Bank stabilization
- Erosion control work
- graffiti removal
- removal of large natural debris (fallen trees, etc.)
- removal of large manmade debris (shopping carts, etc.)

Access to Calabazas Creek is found at a few locations as shown in Figure 7. Within the Project area, there are a total of nine public roadways (including Miller Avenue and Comer Drive), one railroad bridge and two pedestrian bridges that cross Calabazas Creek. There are two District maintenance ramps. One is a concrete ramp located at west side of the creek, downstream of Bollinger Road. The other one is a dirt ramp located on the west side of the creek, upstream of Rainbow Drive.

There is almost continuous access along Regnart Creek. From Calabazas Creek Confluence to downstream at Kim Street there are a total of five public roadways that cross Regnart Creek. There is one dual access ramp located upstream of East Estates Drive. A maintenance road is available on one bank or the other of all 4 reaches except at the long culvert location.

Access to Rodeo Creek is found at a few locations. From Calabazas Creek Confluence to downstream of SR 85 there are a total of four public roadways that cross Rodeo Creek. There are five concrete access ramps. Four of the ramps are located upstream and downstream of both Dartmoor Way and Prospect Road. The fifth one is located downstream of the SR85 on the west side of the creek.

D. Watershed Hydrology

SCVWD Hydrology Unit staff prepared the hydrology report for the Project. The completed report is attached in Appendix D. The information is summarized as follows:

The Calabazas Creek Watershed originates at 1920 feet above mean sea level in the Santa Cruz Mountains and flows north through the Cities of Saratoga, San Jose, Cupertino, Sunnyvale and Santa Clara. It meets San Tomas Aquino Creek at sea level near San Francisco Bay.

The 24-hour rain with an exceedance frequency of 1 percent is used as the design storm to develop design flood flow. Rainfall runoff analysis for the watershed (unit hydrograph analysis) technique was used to perform the flood flow analysis. The end results from the analysis were further compared with historical stream gage records in the watershed (statistical analysis). Based on 2007 hydrology information (same as that collected in 2003), Table 7 shows the design flows for Calabazas Creek at various catch points.

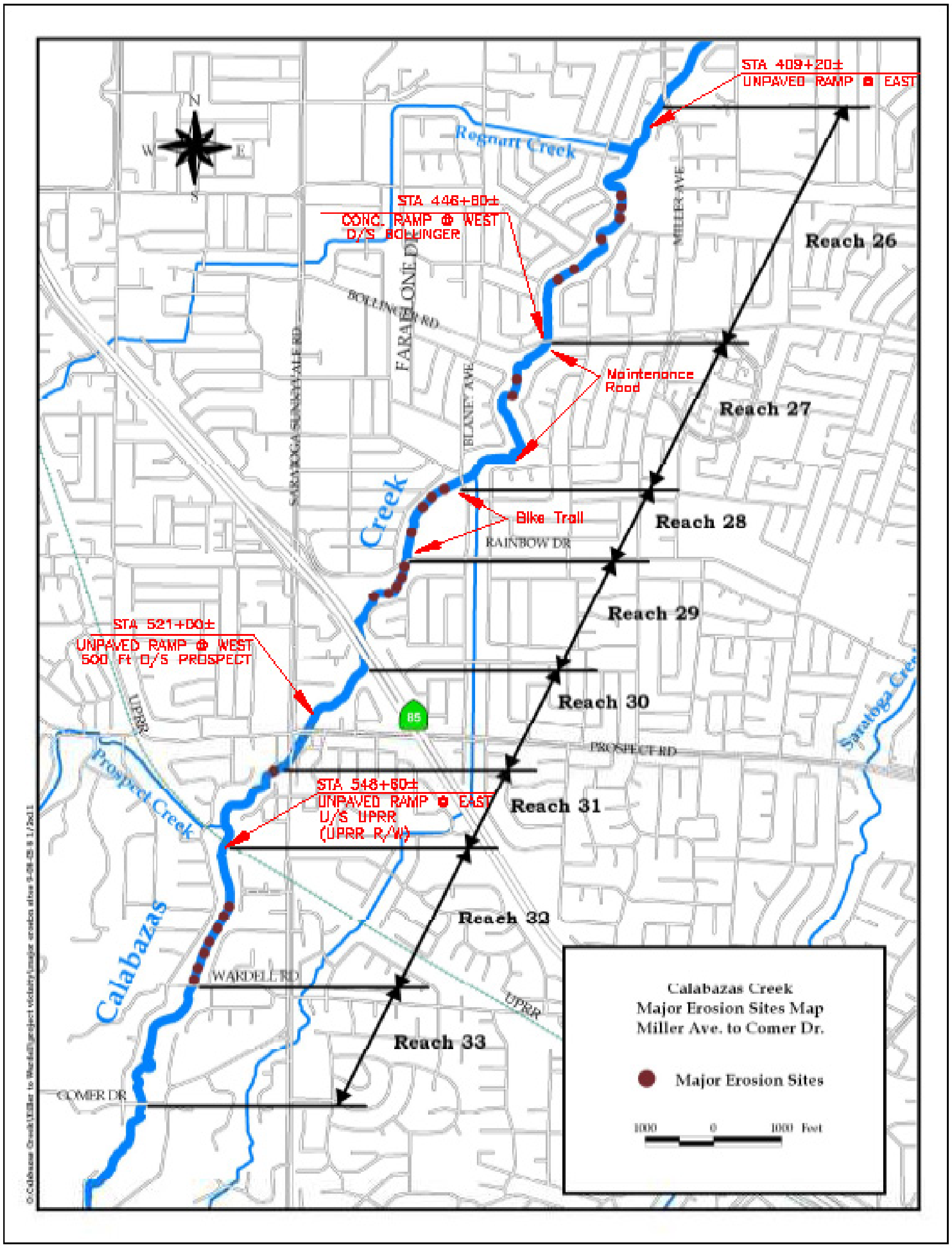

FIGURE 7: CALABAZAS CREEK ACCESS MAP

Table 7: Design Flows for Calabazas Creek

Location	Drainage Area (mi2)	**PEAK FLOW** (cfs)						
		2.33 year or 43% Q	5 year or 20% Q	10 year or 10% Q	25 year or 4% Q	50 year or 2% Q	100 year or 1% Q	500 year or 0.2% Q
Calabazas Creek upstream (u/s) of Prospect Creek	2.88	320	500	650	840	970	1,100	1,400
Prospect Creek u/s Calabazas Creek	1.17	80	130	170	220	260	290	360
Calabazas Creek downstream (d/s) of Prospect Creek	4.05	370	600	800	1,000	1,200	1,400	1,800
Calabazas Creek u/s Rodeo Creek	5.3	500	770	980	1,200	1,400	1,600	2,000
Rodeo Creek u/s Calabazas Creek	1.48	120	170	210	260	290	320	380
Calabazas Creek d/s Rodeo Creek	6.78	600	930	1,200	1,500	1,800	2,000	2,500
Calabazas Creek u/s Regnart Creek	7.57	670	1,000	1,300	1,600	1,900	2,100	2,600
Regnart Creek u/s Calabazas Creek	2.32	210	300	370	450	510	560	670
Calabazas Creek d/s Regnart Creek	9.89	860	1,300	1,650	2,100	2,400	2,650	3,250
Calabazas Creek @ I-280	11.65	1,100	1,500	1,900	2,300	2,600	2,900	3,500
Calabazas Creek @ El Camino Real	13.81	1,200	1,700	2,050	2,500	2,800	3,050	3,600
Calabazas Creek u/s El Camino storm drain (@ Monroe St, near Willcox High School)	14.27	1,200	1,700	2,100	2,600	2,900	3,150	3,750
El Camino storm drain u/s Calabazas Creek	2.79	170	240	300	370	410	450	540
Calabazas Creek d/s El Camino storm drain (@ UPRR)	17.06	1,400	2,000	2,400	2,900	3,300	3,600	4,300
Calabazas Creek @US 101	19.31	1,500	2,100	2,600	3,100	3,500	3,800	4,500
Calabazas Creek d/s SR 237 @ pump station	21.14	1,600	2,200	2,650	3,200	3,600	3,900	4,600

In order to run the creek hydraulic model, the above data was further arranged as regional hydrology data and shown on Table 8, Table 9 and Table 10.

Table 8: Design Flow Rates Used for Calabazas Creek Hydraulic Model

2007 HYDROLOGY REPORT DATA

(same as Hydrology Unit data received in 2003 with interpolations by Project Manager Roy Weese)

GEOGRAPHIC LOCATIONS		STATIONS		10-YEAR FLOW RATES (cfs)	100-YEAR FLOW RATES (cfs)
FROM	TO	FROM	TO		
U/S Miller	D/S Regnart Creek	400+86	409+30	1650	2650
	Regnart Creek	**tributary flow @ mouth**		**370**	**560**
U/S Regnart Creek	D/S Bollinger Ramp	409+30.1	445+00	1300	2100
D/S Bollinger Ramp	D/S Rodeo Creek	445+00.1	475+00	1200	2000
	Rodeo Creek	**tributary flow @ mouth**		**210**	**320**
U/S Rodeo Creek	4 ft Outfall D/S Rainbow	475+00.1	492+00	980	1600
4 ft Outfall D/S Rainbow	U-Frame U/S SR 85	492+00.1	512+00	920	1540
U-Frame U/S SR 85	Outfalls D/S Prospect Rd	512+00.1	525+00	860	1470
Outfalls D/S Prospect Rd	D/S Prospect Creek	525+00.1	546+25	800	1400
	Prospect Creek	**tributary flow @ mouth**		**170**	**290**
U/S Prospect Creek	U/S Comer Drive	546+25.1	593+82.9	650	1100

Table 9: Design Flow Rates used for Regnart Creek Hydraulic Model

LOCATION	**2007 Hydrology Peak Flow** (cfs)	
	10-year	**100-year**
Kim Street to u/s Pacifica Drive	260	400
D/s Pacifica Drive to u/s Blaney Avenue	330	500
D/s of Blaney Ave to Calabazas Creek Confluence	370	560

Table 10: Design Flow Rates used for Rodeo Creek Hydraulic Model

LOCATION	**2007 Hydrology Peak Flow** (cfs)	
	10-year	**100-year**
Rodeo Creek u/s Prospect Road	200	300
Prospect Road to Dartmoor Way	200	310
Dartmoor Way to Calabazas Creek Confluence	210	320

E. Calabazas Environmental Setting

Field Survey

A reconnaissance level biological survey was conducted by a District's biologist and environmental planner. The site visit summary is attached in Appendix F. Observations of plant and wildlife species are summarized as follows:

Vegetation

The lower reaches of Calabazas Creek, between Miller Avenue and Prospect Road, are dominated by a healthy riparian canopy consisting of coast live oak (*Quercus agrifolia*), California buckeye (*Aesculus californica*) and Fremont cottonwood (*Populus fremontii*) with a predominately non-native understory. The majority of non-native species are common European, South African and South American grass species such as kikuyu grass (*Pennisetum clandestinum*) and ripgut grass (*Bromus diandrus*). There are also three aggressive non-native species found within the lower reaches, acacia (*Acacia baileyana*), giant reed (*Arundo donax*) and English ivy (*Hedera helix*). The acacia and giant reed exist in mostly isolated pockets but the ivy is present throughout. These three species have the potential to overtake native vegetation, severely compromising the sustainability of the riparian community. Removal and/or control of these species would enhance the riparian vegetation community.

The upper reaches of Calabazas Creek, between Prospect Road and the Comer Debris Basin, have a more mixed patchwork of vegetation communities. Immediately adjacent to the creek a healthy riparian canopy dominates. The understory is similar to the lower reaches; however, other native species such as Coyote bush (*Baccharis pilularis*) is present. The areas adjacent to the Union Pacific Railroad tracks are dominated by non-native grasses, mainly ripgut grass. The vegetation in the overflow channel adjacent to the creek between Prospect Road and the railroad tracks is also dominated by ripgut grass. However, wetland species (i.e. *Rumex sp.*) were found near the bottom of the channel indicating seasonally wet conditions.

Wildlife

Based on the initial Calabazas Creek site visit, a list of wildlife species known, or likely, to exist in the project area was compiled (See Appendix F: Biology report). Wildlife species expected to occur on the lower reaches of the project consist mainly of common bird and mammal species. Many of the bird species listed are also expected to nest within the project area; these migratory birds and their nests are afforded state and federal protection. The mammal species listed are common to urban streams such as Calabazas Creek; of the mammals listed, only the Raccoon (*Procyon lotor*) and mule deer *(Odocoileus hemionus)* are native to California. No fish were observed during the reconnaissance survey and given past field visits and survey information from District biologists, Calabazas Creek is not expected to regularly support fish species. In addition, the fisheries functions and values map prepared for the District's Stream Maintenance Program in 1992 Planning Study characterizes the reach of creek covered by this project as either "fish scarce" or "mixed native/introduced."

The only amphibian species detected during the site visit was Pacific treefrog (*Hyla regilla*). Very little suitable habitat for the federally threatened California red-legged frog (*Rana aurora draytonii*) was observed during the site visit. Past surveys for the presence of red-legged frogs conducted by District biologists on sections of Calabazas Creek have not detected any populations.

The wildlife values in the upper reaches of the creek are similar to the lower reaches and the same species are potentially using this area. In addition, feral pigs (*Sus scrofa*) have been sighted by District biologist Linda Spahr in the upper project reaches near Comer Drive.

III. PROBLEM DEFINITION

A. Creek Flooding

Historical Flooding

Considerable flooding occurred in the Project area (Calabazas Creek) in 1955, 1978, 1980, 1983, 1986, 1998 and 2002. More recently, in December of 2002, the area around Bollinger Road was flooded. During the 1955 flood, water poured into residential streets and homes, forcing the evacuation of more than 100 families.

Flood Plain of Records

The District's Hydrology Unit has preliminary one-percent flow rates using 2007 Hydrology Report Data. These one-percent flood limits referenced throughout this Report were collected from data supplied by the District's Hydrology Unit in 2003. See Appendix D.

Per the Clean Safe Creeks & Natural Flood Protection Program document (July 25, 2000), the Calabazas Creek Project (Project) from Miller Avenue to Wardell Road would protect "2,483 homes, businesses and schools" avoiding potential flood damages of "$30.9 million". At the time, the number of parcels to be protected for this Project was based on the one-percent floodplain map developed by the District in 1970s.

As part of the nearly completed Planning Study for this Project, topographic information was updated, and detailed hydraulic modeling was conducted to determine the current flood threat in this part of the Calabazas Creek watershed. As a result of these efforts, staff has determined that the floodplain footprint for this reach of Calabazas Creek has been significantly reduced in size. The updated one-percent floodplain boundary encompasses 417 parcels.

The primary reason for the reduction in the extent of the one-percent floodplain is the construction of Highway 85, which bisects the study area for this Project. Calabazas Creek breakout flows have been identified at several locations to the south of Highway 85, and the highway now prevents these flows from flowing overland to areas further north. Additionally, the recent construction of the BMX Park by the City of San Jose along Calabazas Creek near Rainbow Drive, and the current reconstruction of the Bollinger Road Bridge, both provide flood protection to parcels in the area. The District worked closely with Caltrans during the Highway 85 design/construction process, and also coordinated with the City of San Jose with regards to the improvements at the BMX Park.

The new cost estimate for potential damages along Calabazas Creek between Miller Ave. and Wardell Rd. from a one-percent flood event is $11 million. This estimate is based on $26,250 in damages incurred per dwelling.

Present Flooding

Although it is impossible to determine the exact location of future flood event, a computer hydraulic model is still useful in predicting flood limits and floodwater breakout points. Several hydraulic analyses of Calabazas Creek from upstream of Miller Avenue to Comer Drive Bridge, Regnart Creek from Calabazas Creek to Kim Street and Rodeo Creek from Calabazas Creek Confluence to downstream of SR 85 were conducted.

The Calabazas Creek and Rodeo Creek study region is predominantly natural with respect to channel structure, but having a few small hardscape structures such as sacked concrete or rock rip rap. HEC-RAS hydraulic model was used to calculate the hydraulic information.

Regnart Creek - A hydraulic analysis has shown that Regnart Creek has the capacity to convey one percent flood flow (400 to 500 cfs) from Calabazas Creek Confluence to the Kim Street.

Rodeo Creek - A hydraulic analysis has shown that Rodeo Creek has the capacity to convey one percent flood flow (300 cfs-320 cfs) from Calabazas Creek Confluence to downstream of SR 85 (with some minor maintenance work for a small area, STA 14+28 on west bank and STA 17+26 on the east bank). See Table 11 for more details.

Calabazas Creek - The abandoned Old Bollinger Bridge which was located upstream of Bollinger Road Bridge was removed in 2005 and the new Bollinger Road Bridge construction work is expected to be completed by October 2008. Since the construction work for this Project is not scheduled until after 2010, the HEC-RAS runs assumed that the new Bollinger Bridge construction is completed and the Old Bollinger Road Bridge has been removed.

The computer models show that the Union Pacific Rail Road (UPRR) culvert and Saratoga-Sunnyvale Road culvert would be submerged with pressure flow during the one-percent flood. Additionally, the soffit of the pedestrian bridge located at the Cupertino Creekside Condominiums would be submerged. Flooding would have occurred around Calabazas Park for 200 feet, but City of San Jose upgraded the park by construction of BMX Park adjacent to Calabazas Creek between Blaney Avenue and Rainbow Drive in December 2006 that eliminated the flooding at this area. Table 11 below contains more details on the flooding areas.

Table 11: Existing Channel Capacity vs. one-percent Flow

Calabazas Creek		**Approx. Length** (feet)	**one-percent Flow** (cfs)	**Existing Channel Capacity** (cfs)
From Station	To Station			
486+77.5	488+72.7	200	1600	1470
499+31.1	502+41	310	1540	710
531+94.2	535+89.6	400	1400	1080
548+63	554+69.5	610	1100	580
Rodeo Creek		**Approx. Length** (feet)	**one-percent Flow** (cfs)	**Existing Channel Capacity** (cfs)
From Station	To Station			
14+28	17+26	300	320	280*

Capacity will be increased to contain 1% flow with minimum maintenance work

Summary of One-percent Flooding

The flood limits and floodwater breakout points for one percent flood flow under the current creek condition are shown on Figure 8. At the locations shown on Table 11, the existing channel sections do not have enough capacity to handle the one-percent flood flow.

The hydraulic analyses predict that along a 1¼ mile section between Blaney Avenue and south of the Union Pacific Railroad crossing, floodwaters break out along 4 areas of the creek as follows: about 200 feet in length from upstream of Blaney Avenue to upstream of Rainbow Drive around Calabazas Park; 310 feet in length from upstream of Rainbow Drive to upstream of SR 85; 400 feet in length from upstream Saratoga-Sunnyvale Road to Union Pacific Rail Road; and 610’ in length from upstream of UPRR to Wardell Road.

- *Reach 28:* Upstream of Blaney Avenue Culvert to upstream of Rainbow Drive Culvert (STA 478+28.9 to STA 493+96.5). Between STA 486+77.5 and STA 488+72.7 the current channel capacity is 1470 cfs. With the exception of this section, the rest of the reach from upstream of Rainbow Drive to upstream of Blaney Avenue has the capacity to convey one-percent flow (1600-1540 cfs). The range of water surface elevation above the top of the east bank for this area is between 0.1’ and 0.5’. This area is no longer discussed after the construction of BMX Park.

- *Reach 29:* Upstream of Rainbow Drive Culvert to upstream of SR 85 Bridge (STA 493+96.5 to STA 511+84.6). Between STA 499+31.1 and STA 502+41 the channel current capacity is 710 cfs. The rest of the reach from upstream of SR 85 to upstream of Rainbow Drive has the capacity to convey one-percent flow (1540 cfs). The range of water surface elevation above the top of the bank for this area is between 0.3’ and 2.3’.

- *Reach 31:* Upstream of Saratoga-Sunnyvale Road Culvert to upstream of UPRR Culvert (STA 531+94.2 to STA 548+63). Between STA 531+94.2 and STA 535+89.6 the current channel capacity is 1080 cfs. The range of water surface elevation above the top of the bank for this area is between 0.3’ – 2.1’ (parking lot side). The rest of the reach from downstream of UPRR to upstream of Saratoga-Sunnyvale Road has the capacity to convey one-percent flow (1100-1400 cfs).

- *Reach 32:* Upstream of Union Pacific Railroad (UPRR) Culvert to upstream of Wardell Road Culvert (STA 548+63 to STA 571+40.8). Between STA 548+63 and STA 554+69.5 the current channel capacity is 580 cfs. - The range of water surface elevation above the top of the bank for this area is between 0.2' and 3.6'. The rest of the reach from upstream of Wardell to upstream of UPRR has the capacity to convey one-percent flow (1100 cfs).

The detailed hydraulic output data and profiles are attached in Appendix E.

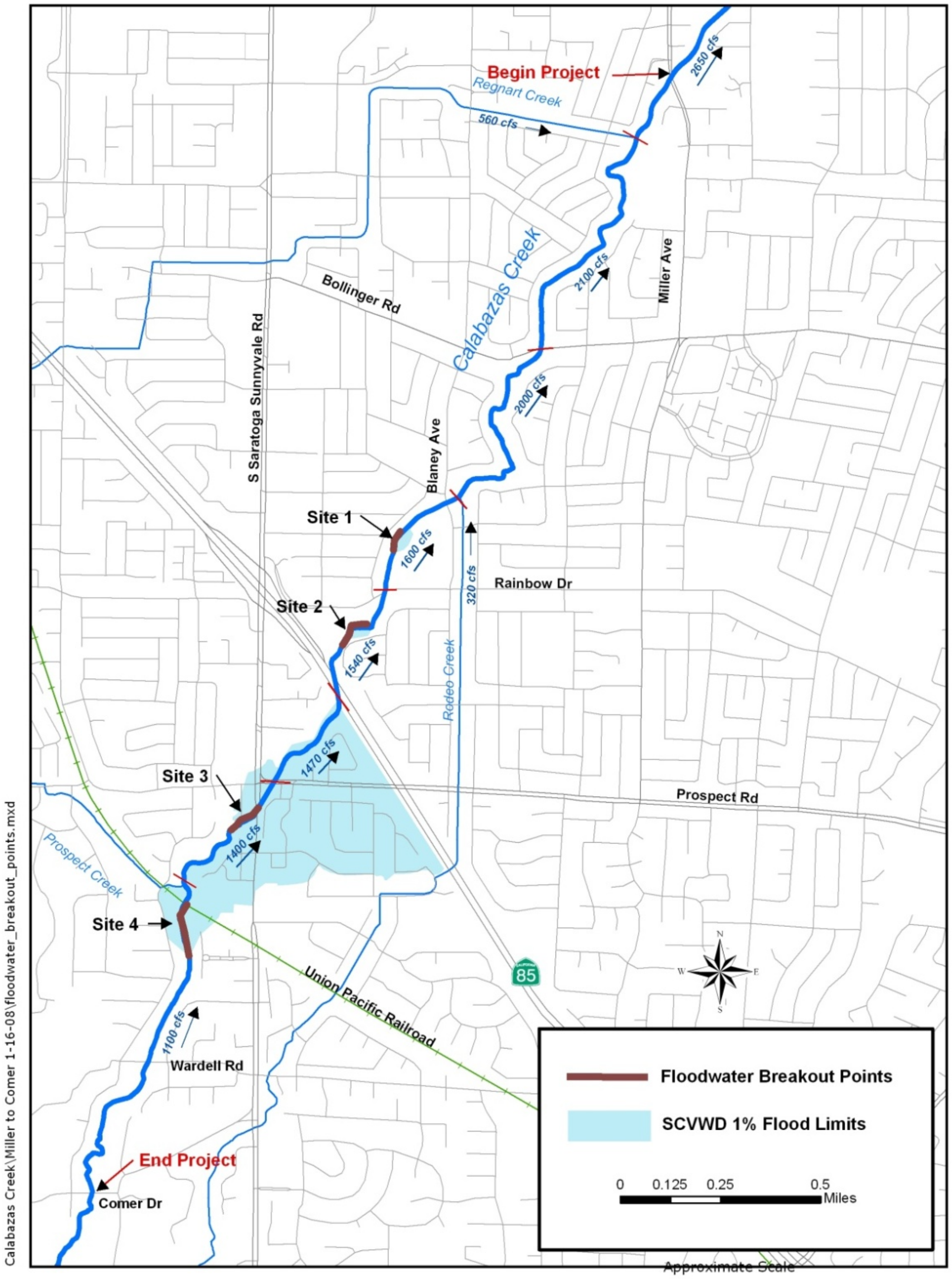

FIGURE 8: FLOODWATER BREAKOUT POINTS

B. Maintenance History

Maintenance Access

The District has adequate rights of way to maintain Calabazas Creek between Miller Avenue and Comer Drive. Ramp access to the erosion sites is summarized in Figure 9 below.

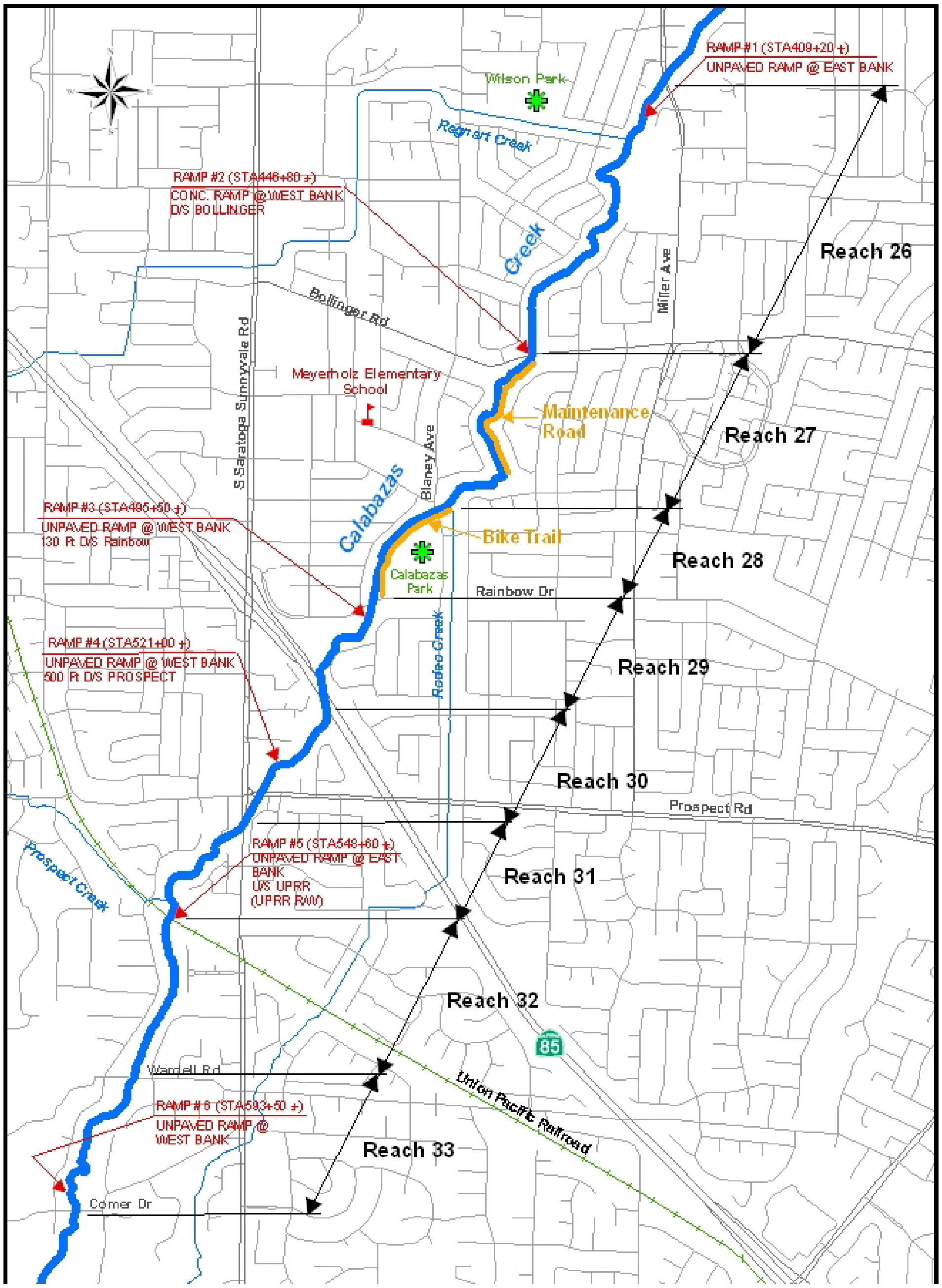

FIGURE 9: MAINTENANCE ACCESS POINTS

Maintenance access isn't a problem on Calabazas Creek.

Historical Erosion Control and Sediment Removal

Tables 12, 13 and 14 present a summary of maintenance work done from 1990-1998 to maintain flood conveyance capacity. This work included erosion control and sediment removal.

Table 12: Calabazas Creek - Summary of historical maintenance work

Location		**Erosion Control / Frequency**	**Sediment Removal Frequency**
From	To		
Miller Avenue	Rodeo Creek	Rock Replacement/ Once Per year	
Rodeo Creek	Prospect Creek	Rock, Miscellaneous/ Once in two years	Once in eight years
Prospect Creek	Comer Drive	Rock, Sack Concrete, and Miscellaneous/ Once per year	Once in four years

Table 13: Regnart Creek - Summary of historical maintenance work

Location		**Erosion Control / Frequency**	**Sediment Removal Frequency**
From	To		
Calabazas Confluence	d/s De Anza Blvd	Once in three years	Once in 2-3 years

Table 14: Rodeo Creek - Summary of historical maintenance work

Location		**Erosion Control / Frequency**	**Sediment Removal Frequency**
From	To		
Calabazas Confluence	u/s Danridge Drive		Once in 3-4 years
Rainbow Drive	60 feet u/s	Once in ten years	

Active Erosion

Some erosion of the creek banks occurs throughout the project reach. The creek is an earth channel very close to adjacent residential properties in many areas. Bank slopes are typically steep. In some eroded areas the bank slopes are almost vertical. The tops of banks are very close to the existing fence lines in many areas.

The Project area has severe erosion in numerous places. Some of the more severe erosion locations are shown in Table 15 below. The corresponding reach map is found in Figure 7.

Table 15: Calabazas Creek - Summary of active erosion locations

Reach	Location		Approx. Station #	
	From	To	From	To
26	Miller Avenue	Bollinger Road	410+82	412+11
			424+30	427+00
			428+68	430+03
			436+11	436+26
27	Bollinger Road	Blaney Avenue	468+25	468+50
28	Blaney Avenue	Rainbow Drive	485+70	487+20
29	Rainbow Drive	SR 85	497+02	497+87
30	SR 85	Saratoga-Sunnyvale Road	516+87	517+49
31	Saratoga – Sunnyvale Road	UPRR	532+77	532+87
			536+66	536+73
			543+53	543+65
			545+26	545+96
32	UPRR	Wardell Road	551+97	554+00
			559+33	559+45
			560+75	560+80
			565+64	566+52
33	Wardell Road	Comer Drive	587+75	588+25
			589+55	589+62

Minor erosion occurs on Rodeo and Regnart Creeks. The banks are not very steep on either of these two tributaries and the erosion there doesn’t pose a risk of major impact on adjacent properties. Staff recommends that Maintenance Unit addresses the erosion on these tributaries.

IV. COMMUNITY OUTREACH

The District has employed four techniques to establish open communication with the public. Specifically, the District has provided: 1) Public meetings; 2) a District internet web page; 3) e-mail notifications; and 4) community flyers to keep the public aware of the progress on the Calabazas Planning project.

Three public meetings were held to discuss the present flooding and erosion problems identified from this preliminary study. The meetings were held in the evenings at community centers near the neighborhoods benefiting the most from the proposed Calabazas project. Two meetings were held on July 25th and August 25th, 2005 at the

Cupertino Community Hall in Cupertino and one was held on August 2nd, 2005 at the Saratoga Senior Center in Saratoga.

At the public meetings, the District provided the public the opportunity to express their concerns and direct questions to District staff on the project. The attendees expressed most concerns due to severe erosion problems behind their individual properties. Some meeting attendees voiced concerns about flooding on Rodeo Creek, which is one of the three main Calabazas tributaries in the project area.

The District has been proactive in distributing mass mail-outs announcing these public meetings and the preliminary survey work.

The District has also been conscious of the highly computer literate demographics where the Calabazas project work is proposed. A District web page was provided early in the Problem Definition stage of the planning process. The web site features pertinent creek photos, reports (including this report), schedule and other pertinent information. Questions were collected at each of the three public meetings – 26 questions on July 25th, 20 questions on August 2nd and 26 questions on August 25th. The attendee's questions and the District answers are also posted on the website.

V. OPPORTUNITIES & CONSTRAINTS

A. Land Use Opportunities

Site visits and Real Estate records show opportunities for a storage pond at swale area between Saratoga-Sunnyvale tunnel and UPRR. The swale could be modified to be a storm water storage reservoir during peak flows that could reduce channel peak flow during large storm event. The City of San Jose began construction of a BMX Park adjacent to Calabazas Creek between Rainbow Drive and Blaney Avenue in December, 2006. Grading required to build the BMX Park raised the adjacent Calabazas Creek banks high enough to eliminate flooding at this location. This is a good opportunity for the project to coordinate the flood protection needs in this area with the Park upgrade plan.

B. Maintenance Access

At several locations in Calabazas Creek the District has rights-of-way adjacent to the creek, but not in the creek. Access to the bottom of the channel is limited to one concrete ramp on the downstream side of Bollinger Road. Objectives might be refined later to include acquisition of Real Estate easement to facilitate maintenance activities, even in sections of the creek where no construction work is proposed.

C. Public Access

The City of San Jose is interested in upgrading trails within the Calabazas Creek Park located in Reach 28 (between Rainbow Drive and Blaney Avenue) immediately adjacent to the creek. The District will coordinate with the City of San Jose to develop a plan to integrate the recently constructed BMX Park with the proposed SCVWD Calabazas Meander enhancement.

VI. POTENTIAL CHANGES TO PROJECT OBJECTIVES & SCOPES

Flooding was identified as a potential issue on Calabazas Creek at four floodwater breakout points (see Figure 8). The most downstream site (site #1) is located at Calabazas Park between Blaney Avenue and Rainbow Drive. Site #1 flooding was eliminated in spring, 2007 with the completion of the City of San Jose's new BMX park improvements. Site #2 is located just downstream of Highway 85 and adjacent to the Cupertino Creekside Condominiums (CCC). Flooding occurs at Site #2 due to a channel constriction caused by a pedestrian bridge. This bridge was installed over Calabazas Creek without a District permit in 1964 and causes flooding only to the CCC pool and an undeveloped, District-owned flood plain. Staff doesn't recommend addressing flooding at Site #2 as part of the Project. Staff recommends that Calabazas flood control work for the project be limited to address flooding only at Site #3 and Site #4 (see Figure 8).

The community has observed considerable flooding along Rodeo Creek in recent years. However, recent Rodeo Creek flooding has been due in part to Calabazas overbank flows which leave Calabazas Creek and travel overland through neighborhoods into an upstream segment of Rodeo Creek. The current path of these flood waters is from Calabazas at the UPRR and at Saratoga-Sunnyvale Road across streets and into Rodeo Creek at the UPRR and at Prospect Road. See Figure 8 for the area map. After the project addresses Calabazas flooding at Sites #3 and #4, flows in Rodeo Creek will be reduced appreciably.

The potential for Rodeo Creek to over bank is very small. Less than 2 inches of flooding occurs during the 1% storm within a 300 feet section of channel located just upstream of Rainbow Drive. The maintenance roads at this location could be graded to address this minor flooding. Staff recommends addressing Rodeo flooding situations through our Field Operations Unit.

VII. NEXT STEPS

- More detailed biological survey will be conducted by the environmental consultant.
- Develop flood protection plan
- Develop erosion repair plan.
- Develop sedimentation transport analysis.
- Develop conceptual alternatives for Comer debris modification.
- Identify creek restoration alternatives.

ACCEPTED BY:

Katherine Oven Assistant Operating Officer	Beau Goldie Deputy Operating Officer

REFERENCES

1. Santa Clara Valley Water District*. Calabazas Creek planning study, Guadalupe Slough to Miller Avenue, consisting of the combined engineer's report and final environmental impact report.* April, 1992.

2. Kennedy/Jenks Consultants. *Comer Debris Basin Engineering Feasibility Study final report*. April, 2002.

3. Santa Clara Valley Water District*. Reconstruction of Bollinger Bridge over Calabazas Creek: final initial study and mitigated negative declaration.* May, 2003.

4. Santa Clara Valley Water District. Calabazas Creek: *Reconstruction of Bollinger Road Bridge: a joint project with the City of Cupertino: engineer's report.* December, 2004.

5. Santa Clara Valley Water District. *Roughness Coefficient "n" Value three different Calculation Reports. Calabazas Creek* September 2005*, Regnart Creek* July 2007 *and Rodeo Creek* January 2007*.*